9110-04-P

DEPARTMENT OF HOMELAND SECURITY

Coast Guard

33 CFR Part 164

46 CFR Parts 25, 26, 28, 32, 35, 77, 78, 96, 97, 108, 109, 121, 130, 140, 167, 169, 184, 195, and 196

[Docket No. USCG-2021-0291]

RIN 1625-AC74

Electronic Chart and Navigational Equipment Carriage Requirements

AGENCY: Coast Guard, Homeland Security (DHS).

ACTION: Advance notice of proposed rulemaking.

SUMMARY: The Coast Guard seeks public input regarding the modification of the chart and navigational equipment carriage requirements in the Code of Federal Regulations (CFR). This advance notice of proposed rulemaking (ANPRM) outlines the Coast Guard's broad strategy to revise its CFR chart and navigational equipment carriage requirements to implement statutory electronic-chart-use provisions for commercial U.S.-flagged vessels and certain foreign-flagged vessels operating in the waters of the United States. This ANPRM is necessary to obtain additional information from the public before issuing a notice of proposed rulemaking. It will allow us to verify the extent of the requirements for the rule, such as how widely electronic charts currently are used, which types of vessels are using them, the appropriate equipment requirements for different vessel classes, and where the vessels operate, and will thereby allow us to tailor electronic chart requirements to vessel class and location.

DATES: Comments and related material must be received by the Coast Guard on or before [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may submit comments identified by docket number USCG-2021-0291 using the Federal eRulemaking Portal at www.regulations.gov. See the "Public Participation and Request for Comments" portion of the **SUPPLEMENTARY INFORMATION** section for further instructions on submitting comments.

FOR FURTHER INFORMATION CONTACT: For information about this document, call or email John Stone, Office of Navigation Systems (CG-NAV-2), Coast Guard; telephone 202-372-1093, email John.M.Stone2@uscg.mil.

SUPPLEMENTARY INFORMATION:

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I. Public Participation and Request for Comments

The Coast Guard views public participation as essential to effective rulemaking, and will consider all comments and material received during the comment period. Your comment can help shape the outcome of this rulemaking. If you submit a comment, please include the docket number for this rulemaking, indicate the specific section of this document to which each comment applies, and provide a reason for each suggestion or recommendation.

Submitting comments. We encourage you to submit comments through the Federal Decision Making Portal at www.regulations.gov. To do so, go to www.regulations.gov, type USCG-2021-0291 in the search box and click "Search."

Next, look for this document in the **Search Results** column, and click on it. Then click on the **Comment** option. If you cannot submit your material by using www.regulations.gov, call or email the person in the **FOR FURTHER INFORMATION CONTACT** section of this advance notice of proposed rulemaking document (ANPRM) for alternate instructions.

Viewing material in docket. To view documents mentioned in this ANPRM as being available in the docket, find the docket as described in the previous paragraph, and then select "Supporting & Related Material" in the Document Type column. Public comments will also be placed in our online docket and can be viewed by following instructions on www.regulations.gov Frequently Asked Questions webpage. We review all comments received, but we will only post comments that address the topic of the proposed rule. We may choose not to post off-topic, inappropriate, or duplicate comments that we receive.

Personal information. We accept anonymous comments. Comments we post to *https://www.regulations.gov* will include any personal information you have provided. For more about privacy and submissions in response to this document, see Department of Homeland Security's eRulemaking System of Records notice (85 FR 14226, March 11, 2020).

Public meeting. We do not plan to hold a public meeting, but we will consider doing so if we determine from public comments that a meeting would be helpful. We would issue a separate **Federal Register** document to announce the date, time, and location of such a meeting.

II. Abbreviations

AIS	Automatic identification systems
ANPRM	Advance notice of proposed rulemaking
DHS	Department of Homeland Security
ECDIS	Electronic chart display and information system
ECS	Electronic chart system
ENC	Electronic navigational chart

EPFD	Electronic position fixing device
FR	**Federal Register**
GT	Gross tons
IEC	International Electrotechnical Commission
IEHG	Inland Electronic Navigational Chart Harmonization Group
IENC	Inland Electronic Navigational Charts
IHO	International Hydrographic Organization
IMO	International Maritime Organization
NOAA	National Oceanic and Atmospheric Administration
NVIC	Navigation and Vessel Inspection Circular
RNC	Raster navigational chart
RTCM	Radio Technical Commission for Maritime Services
§	Section
SOLAS	International Convention for the Safety of Life at Sea
U.S.C.	United States Code

III. Basis and Purpose

A. Purpose of the Advance Notice of Proposed Rulemaking (ANPRM)

This advance notice of proposed rulemaking (ANPRM) seeks comments regarding possible modifications to the chart and navigational equipment carriage requirements in titles 33 and 46 of the Code of Federal Regulations (CFR). This ANPRM outlines the Coast Guard's broad strategy to revise its CFR chart and navigational-equipment carriage requirements, to implement statutory electronic-chart-use provisions for commercial U.S.-flagged vessels, to include self-propelled vessels of at least 65 feet in overall length, passenger vessels for hire, towing vessels of more than 26 feet in overall length and 600 horsepower, and certain foreign-flagged vessels operating in the waters of the United States.

In this ANPRM, we are seeking information on how widely electronic charts are used, which types of vessels are using them, and where the vessels operate, as well as views on the appropriate equipment requirements for different vessel classes. The information obtained from this ANPRM will assist in drafting a proposed rule that tailors electronic charts requirements to vessel class and location.

B. Statutory Authority

Title 46 of the United States Code (U.S.C.) Section 3105(a)(1) deems certain

vessels "equipped with and operating electronic navigational charts that are produced by a government hydrographic[1] office or conform to a standard acceptable to the Secretary" as compliant with charting requirements under title 33 or 46 of the CFR.[2] Additionally, 46 U.S.C. 3105(a)(2)(C) permits the granting of waivers to vessels that use "software-based, platform independent electronic chart systems the Secretary determines are capable of displaying electronic navigational charts with necessary scale and detail to ensure safe navigation for the intended voyage."

These acceptable standards and capabilities need to be clarified because paper and raster charts[3] are being discontinued[4] and replaced by born-digital[5] electronic navigational charts (ENCs). This clarification is necessary because ENCs require additional equipment, such as a display system, for the mariner to safely and effectively navigate.

Under 46 U.S.C. 70001(a)(3), the Coast Guard generally "may require vessels to install and use specified navigation equipment, communications equipment, electronic relative motion analyzer equipment, or any electronic or other device necessary to comply with a vessel traffic service or that is necessary in the interests of vessel safety." Upon completion of the National Oceanic and Atmospheric Administration (NOAA)

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[1] The International Hydrographic Organization (IHO) defines hydrography as, "the branch of applied sciences which deals with the measurement and description of the physical features of oceans, seas, coastal areas, lakes and rivers, as well as the prediction of their change over time, for the primary purpose of safety of navigation and in support of all other marine activities, including economic development, security and defense, scientific research, and environmental protection." This definition was accessed on October 10, 2021 from: *https://iho.int/en/importance-of-hydrography*. Recognized hydrographic offices in the United States include the National Oceanic and Atmospheric Administration (NOAA), the U.S. Army Corps of Engineers (USACE), and the National Geospatial-Intelligence Agency (NGA).

[2] Pub. L. 108-293 (2004), codified at 33 U.S.C. 1223a, revised and re-codified at 46 U.S.C. 3105 (Pub. L. 115-282, Section 402(a)(1) (2018)). 46 U.S.C. 3105 was recently amended by section 8301 of the "William M. (MAC) Thornberry National Defense Authorization Act for Fiscal Year 2021" (Pub. L. 116-283).

[3] A *raster chart* is an electronic reproduction (a picture) made from a detailed scanning of a paper chart.

[4] See NOAA, "Sunsetting Traditional NOAA Paper Charts End of Paper and Raster Nautical Chart Production Introduction of NOAA Custom Charts" (November 14, 2019), available at *https://nauticalcharts.noaa.gov/publications/docs/raster-sunset.pdf*. This document was accessed on October 5, 2021.

[5] *Born-digital* means to be produced in digital form, rather than being converted from print to digital form.

"Sunset Plan,"[6] traditional paper charts may no longer be available for some waterways or certified safe for navigation for some vessels, which we discuss in more detail in section IV.A of this ANPRM. Therefore, it may be necessary to require electronic chart and related navigational equipment carriage on certain vessels.

IV. Background

The regulations in titles 33 and 46 of the CFR require certain vessels to carry currently corrected nautical charts, marine charts, and publications when operating in U.S. waters, as well as equipment necessary to ensure safe navigation (see table 1 in this ANPRM for a list of regulations containing these requirements). At the time these regulations were issued in 1951,[7] paper charts were the only available form of charts. Since that time, paper charts have evolved into electronic charts.

Section 410 of the Coast Guard and Maritime Transportation Act of 2004 required certain vessels operating on the navigable waters of the United States be equipped with and operate electronic charts.[8] At the time, however, recognized hydrographic authorities did not maintain a full portfolio of electronic charts, and an affordable means for a mariner to display and safely use electronic charts was not available on the market. Consequently, the Coast Guard did not issue implementation regulations. Since the enactment of section 410 in 2004, charting systems manufacturers have developed multiple systems that are available to mariners for use, and recognized hydrographic authorities now provide a full suite of electronic charts.

A. "Sunsetting" of Raster Navigational Charts

NOAA is the U.S. hydrographic authority for nautical charts covering the U.S. shoreline, Great Lakes, and waters within the U.S. Exclusive Economic Zone. NOAA is undertaking a 5-year "sunsetting" program to gradually end the production of its raster

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[6] Id.
[7] 16 FR 1511, 1542 (February 14, 1951).
[8] See Pub. L. 108-293 (2004).

navigational charts (RNC) and paper nautical charts.[9] Production of all NOAA's RNCs and NOAA's paper nautical charts is scheduled to cease by January 2025.[10]

B. Transition to Electronic Navigational Charts, and Electronic Chart Display and Information Systems

In the 1990s, electronic chart technology took a leap forward with the creation of ENCs.[11] ENCs consist of a series of data points and lines that define the shape and size of features to be displayed on a computer. These data points and lines are linked to a database within the ENC that can provide additional information about each charted feature. Layers of ENC information, such as geographic place names or bathymetry, can be turned on and off to reduce clutter when not needed. Charted objects, such as regulated area restrictions, can be selected to have the chart display system show more information about the feature. The chart display can be zoomed in or out to have the depiction of features expanded or shrunk. When zoomed in, the size of text and symbols displayed on the ENC remains the same. This is an improvement over RNCs; when RNCs are zoomed in, the display becomes increasingly blocky or pixelated.

Because ENCs are machine readable, they can interface with existing shipboard navigational systems, such as electronic position fixing devices (EPFDs), speed distance measuring equipment (for example, radar and speed logs), gyrocompasses and transmitting heading devices, and automatic identification systems (AIS). This allows ENCs to be oriented in the direction of the vessel's transit and provide warnings or alerts for low water, restricted areas, and course deviations.

The development and availability of ENCs was such a significant change in charting that, in 2002, the International Maritime Organization (IMO) amended its

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[9] See NOAA's notice and request for comments, "Sunsetting of Raster Nautical Charts," 84 FR 62512, November 15, 2019.
[10] See NOAA's Raster Charts Products website, available at Farewell to Traditional Nautical Charts (noaa.gov).
[11] See NOAA's "Transforming the NOAA ENC. Implementing the National Charting Plan." *https://nauticalcharts.noaa.gov/publications/docs/enc-transformation.pdf*.

definition of a *nautical chart* in the International Convention for the Safety of Life at Sea (SOLAS), as amended.[12] SOLAS, Chapter V, Regulation 2 defines *Nautical chart* or *nautical publication* as "a special-purpose map or book, or a specially compiled database from which such a map or book is derived, that is issued officially by or on the authority of a Government, authorized Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation."

The U.S. Army Corps of Engineers began production of Inland Electronic Navigational Charts (IENC) in 2001. In 2002, NOAA announced that its ENC met the SOLAS definition of a nautical chart and subsequently renamed their ENC product, "NOAA ENC®," through a statement of policy.[13] In 2002, the Coast Guard certified the Electronic Chart Display and Information System (ECDIS) as meeting the nautical chart requirements in 33 CFR 164.33(a)(1), because it met the same navigational safety concerns as paper nautical charts.[14] During this time, foreign government hydrographic offices also began producing ENCs.

In an effort to standardize electronic charting data, the International Hydrographic Organization (IHO) further defined[15] and created standards and specifications relevant to an ENC in 1996. The IHO also recognized the manufacturer's role in ENC distribution by acknowledging and defining the transformation of the entire ENC contents and updates accessed by the display system (referred to as a system electronic navigational chart).[16,17] The IMO amended its definition of the term *ENC* to include conformity to

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[12] These amendments came into force on January 7, 2002.
[13] 67 FR 39695, June 10, 2002.
[14] See Coast Guard notice of policy, "Carriage of Navigation Equipment for Ships on International Voyages" (67 FR 53382, August 15, 2002); and notice of policy; extension, "Carriage of Navigation Equipment for Ships on International Voyages" (69 FR 42192, July 14, 2004).
[15] See IHO S-32 Hydrographic Dictionary, *electronic navigational chart*, available at: *http://iho-ohi.net/S32*. This website was accessed on October 5, 2021.
[16] IHO Resolutions of the International Hydrographic Organization, Publication M-3, 2nd Edition – 2010, Updated August 2018. This document is available at: *https://iho.int/iho_pubs/misc/M3-E-AUGUST18.pdf*. This website was accessed on January 19, 2022.
[17] According to the IHO S-32 Hydrographic Dictionary, *system electronic navigational chart*, is a database, in the manufacturer's internal ECDIS (the display system) format, resulting from the loss-less transformation of the entire ENC contents and updates. This database is accessed by ECDIS (the display

IHO standards in 2006 with Resolution MSC.232(82), "Adoption of the Revised Performance Standards for Electronic Chart Display and Information Systems (ECDIS)."[18] In 2009, SOLAS Chapter V, Regulation 19 mandated that certain commercial vessels on international voyages use ENCs as well as ECDIS.

Since 2002, charting system manufacturers have developed other systems in addition to ECDIS, such as Electronic Chart Systems (ECS) and Chart Radars that can display ENC data. In response to this development, the Coast Guard recognizes that an ECDIS is not the only way to display ENC data. More information is provided by ENC displays integrated with navigational equipment, including real-time vessel position, and additional data layers, such as bathymetry, which can be used to trigger automatic safety alarms in equipped navigational systems. As a result, use of ENCs in an ECDIS or other electronic chart system may enhance situational awareness and navigational safety beyond the ability of paper nautical charts.

C. Existing Chart Carriage and Associated Navigational Equipment Carriage Regulations

Table 1 lists the parts, subparts, and sections in titles 33 and 46 of the CFR that contain the existing chart carriage and associated navigational equipment carriage requirements by vessel class. These CFR references are being considered for updating in a future rulemaking or rulemakings, informed by comments received from this ANPRM, to allow for electronic charts, electronic chart systems, and any integration with new or existing navigational equipment. This table is provided for information and is not intended to suggest that a future rule would modify every regulation in this table. Only

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system) for the display generation and other navigational functions and is the equivalent to an up-to-date paper chart.

[18] *ENC* means the database, standardized as to content, structure and format, issued for use with ECDIS by or on the authority of a Government, authorized Hydrographic Office or other relevant government institution, and conform to IHO standards. The ENC contains all the chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart (such as sailing directions), which may be considered necessary for safe navigation.

necessary regulations pertaining to chart carriage and navigational equipment carriage would be addressed in a future rulemaking.

Table 1: Existing Chart Carriage and Associated Navigational Equipment Carriage Regulations in 33 and 46 CFR

Vessel Type	Chart Carriage Regulations	Navigational Equipment Carriage Regulations
Self-propelled Vessels ≥1600 Gross Tons (GT)	33 CFR 164.33	33 CFR 164.35 33 CFR 164.41 33 CFR 164.46
Vessels ≥10,000 GT	33 CFR 164.33	33 CFR 164.35 33 CFR 164.37 33 CFR 164.38 33 CFR 164.40 33 CFR 164.41 33 CFR 164.46
Towing Vessels ≥12 Meters	33 CFR 164.72(b) 46 CFR 140.705	33 CFR 164.46 33 CFR 164.72 46 CFR 140.725
Commercial Fishing Vessels	46 CFR 28.225	33 CFR 164.46 46 CFR part 28
Tank Vessels	46 CFR 35.20-1	33 CFR 164.46 46 CFR part 32, subpart 32.15
Passenger Vessels (U.S. or foreign) >100 GT	46 CFR 78.05-5	33 CFR 164.46 46 CFR part 77
Cargo Vessels	46 CFR 97.05-5	33 CFR 164.46 46 CFR part 96
Mobile Offshore Drilling Units	46 CFR 109.565	33 CFR 164.46 46 CFR part 108
Passenger Vessels (U.S.) <100 GT Carrying > 150 Passengers or with Overnight Accommodations for >49 Passengers	46 CFR 121.420	33 CFR 164.46 46 CFR part 121
Offshore Supply Vessels	46 CFR 130.330	33 CFR 164.46 46 CFR part 130
Public Nautical School Ships	46 CFR 167.65-45	33 CFR 164.46 46 CFR part 167, subpart 167.40
Sailing School Vessels	46 CFR 169.809	33 CFR 164.46 46 CFR part 169, subpart 169.700
Passenger Vessels (U.S.) < 100 GT Carrying ≤ 150 Passengers or with Overnight Accommodations for ≤ 49 Passengers	46 CFR 184.420	33 CFR 164.46 46 CFR part 184
Oceanographic Research Vessels	46 CFR 196.05-5	33 CFR 164.46 46 CFR part 195
Uninspected Vessels[19]	46 CFR 26.03-4	Not Applicable

[19] Uninspected vessels 46 CFR part 25, subpart 25.10, manufacturers, distributors, and dealers must install navigation lights on uninspected vessels. However, we are considering adding new requirements in 46 CFR part 25 for electronic chart systems, and any integration with new or existing navigational equipment.

D. Current Electronic Chart Systems Carriage and Equivalency Guidance

In 2005, the Coast Guard solicited the assistance of the Radio Technical Commission for Maritime Services (RTCM)[20] to expand its standard, RTCM 10900.6, "RTCM Standard for Electronic Chart Systems (ECS)," to enhance the use of AIS and better provide for electronic chart carriage. In three subsequent editions, the RTCM standard addressed the backup requirements for SOLAS ECDIS and the use of electronic charts on non-SOLAS class vessels. The updated 7th edition of RTCM's ECS standard (10900.7) was published on April 5, 2017. This edition established four classes of ECS and supported integration of other installed navigational equipment, including radar, AIS, heading input, and electronic position fixing systems.

These developments led the Coast Guard to pursue new or modified standards to ECS, and were a key consideration for guidance issued via Navigation and Vessel Inspection Circular (NVIC) 01-16, "Use of Electronic Charts and Publications in Lieu of Paper Charts, Maps and Publications." NVIC 01-16 was issued on February 3, 2016 to address the use of electronic charts domestically.[21] NVIC 01-16 established an equivalency to the chart and publication carriage requirements in titles 33 and 46 of the CFR by permitting the use of ENCs in lieu of paper charts, under certain circumstances. NVIC 01-16 was updated in 2017[22] and in 2020[23] to reflect changes in available technology and in the use of electronic publications. The decline in the use of paper

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[20] The RTCM is an international non-profit scientific, professional and educational organization that is actively engaged in the development of international standards for maritime radio navigation and radio communication systems.

[21] Although it has been revised by a subsequent document, the original NVIC 01-16 is available to view at *NVIC_01-16_electronic_charts_and_publications.pdf (menlosecurity.com*). This document was accessed on October 5, 2021.

[22] 82 FR 32851, July 18, 2017. Although it has been revised by a subsequent document, NVIC 01-16 (Change 1) is available to view at *https://www.navcen.uscg.gov/pdf/electronic_charting/NVIC_01-16_ElectronicChartsAndPubsCh1.pdf*. This document was accessed on October 5, 2021.

[23] 85 FR 31789, May 27, 2020. NVIC 01-16 (Change 2) is available at *https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/NVIC/2016/NVIC_01-16_Ch-2_Final_2020-05-21.pdf?ver=2020-05-26-172404-563*. This document was accessed on October 5, 2021.

nautical charts and rise in use of ENCs that started over two decades ago has continued since NVIC 01-16 was issued in 2016.[24] The Coast Guard anticipates that any rule resulting from this ANPRM would supersede NVIC 01-16.

V. ANPRM Discussion

With this ANPRM, the Coast Guard seeks information and public input to assist us in establishing, through a future rulemaking, acceptable electronic chart and related navigational equipment carriage regulations in titles 33 and 46 CFR. The intent of changing the CFR sections referenced in table 1 would be to provide safe navigation and carriage requirements based on ENC chart data produced by U.S. hydrographic offices.

More than 50 years ago, when the Coast Guard mandated chart carriage on certain commercial vessels,[25] the only charts available to meet the requirements were paper charts. Under the existing regulations referenced in table 1, not all vessels are required to carry an electronic position fixing device, heading input device, or ECDIS. The current domestic chart and navigational equipment carriage regulations were not written for an electronic chart-only environment. Although both 46 U.S.C. 3105 and NVIC 01-16 (Change 2) provide for equivalencies between paper and electronic charts, they do not change existing CFR requirements.

VI. Information Requested

With this ANPRM, the Coast Guard seeks public participation in order to obtain additional information before issuing a notice of proposed rulemaking with proposed regulatory text. The information we obtain from you, the public, should allow us to better develop requirements that better ensure safe navigation and carriage based on ENCs. We seek information on how widely used electronic charts are today, what types of vessels are equipped and operate with electronic charts, where these vessels typically

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[24] See footnote 5 of this ANPRM for the link to the NOAA Sunsetting Paper.
[25] 16 FR 1511, 1542, February 14, 1951.

operate, and what are appropriate equipment requirements for different vessel classes. The more detailed information you provide, the better informed the Coast Guard will be when considering possible modifications to existing carriage requirements. We are particularly interested in detailed reasons for your answers, and in explanations of any calculations you make or other information on how you reach your determinations when responding to these questions.

Specifically, we seek responses to the following questions:

Question 1. Should electronic charts and related navigational equipment be required on certain vessels not on international voyages even if paper charts are available for use and certified for navigation? If yes, which vessels? Please explain why.

Question 2. Title 46 U.S.C. 3105 allows for self-propelled commercial vessels of at least 65 feet in overall length, vessels carrying more than a number of passengers for hire determined by the Secretary, and towing vessels of more than 26 feet in overall length and 600 horsepower, while operating on the navigable waters of the United States, equipped with and operating electronic navigational charts that are produced by a government hydrographic office or conform to a standard acceptable to the Secretary, to be deemed in compliance with any requirement under title 33 or 46, Code of Federal Regulations, to have a chart, marine chart, or map on board. Paragraph (a)(1)(D) of this statute gives the Secretary discretion to provide electronic chart equivalency standards for any other vessel not specified. For which types of vessels not listed in the statute should the Coast Guard consider creating electronic chart equivalency standards? What types of vessels, if any, should be excluded? Please explain why.

Question 3. Paragraph (a)(1)(B) of 46 U.S.C. 3105 allows for "a vessel carrying more than a number of passengers for hire determined by the Secretary" to be equipped with and operating electronic charts to meet chart requirements under titles 33 and 46 of the CFR. If we were to establish electronic chart carriage regulations, should we set the

number of passengers the same as in 46 CFR chapter I, subchapter K, which applies to passenger vessels carrying more than 150 passengers or with overnight accommodations for more than 49 passengers? If not, what number of passengers for hire should the Coast Guard use as a minimum for electronic chart carriage regulations?

Question 4. The National Technology Transfer and Advancement Act (note to 15 U.S.C. 272) directs agencies to use voluntary consensus standards in their regulatory activities. The Coast Guard is aware of two voluntary industry consensus standards that provide standards for ECDIS/ECS: (1) International Electrotechnical Commission (IEC) 61174:2015;[26] and (2) RTCM 10900.7.[27] What other voluntary industry standards should we consider? Which of these voluntary industry standards should be adopted, and why? Would these standards provide sufficient requirements for the vessel categories listed in 46 U.S.C. 3105? If adopted, are these voluntary consensus standards too prescriptive or do they contain too many requirements for certain vessel classes? If so, why?

Question 5. The Secretary of Homeland Security may allow for exemptions and waivers, as stated in 46 U.S.C. 3105(a)(2)(C), to permit vessels as described in subparagraphs (A) through (D) of paragraph (1) "that operate solely landward of the baseline from which the territorial sea of the United States is measured to utilize software-based, platform-independent electronic chart systems that the Secretary determines are capable of displaying electronic navigational charts with necessary scale and detail to ensure safe navigation for the intended voyage." Should any vessels be exempted from electronic chart system requirements? What standard, if any, should vessels operating inside the U.S. territorial sea baseline be required to meet? If your vessel is currently in this category and is using electronic charting systems, what types of software and hardware are you using?

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[26] IEC 61174:2015 ECDIS standard.
[27] RTCM 10900.7 ECS standard.

Question 6. Regarding EPFDs, NVIC 01-16 (Change 2) states that position updates must be in real-time (delivered less than every 2 seconds), sound (8-to-20-meter accuracy), and have a minimum resolution of 0.001 minutes (devices dependent on cellular connection are not acceptable) in accordance with the Federal Radionavigation Plan, IMO Resolution MSC.112(73), and IEC 61108-1. Should we incorporate these standards in regulations for EPFDs used with ENCs for navigational functions? If not, what standard(s) should they meet? Please explain why.

Question 7. Should electronic navigational equipment listed in A through F below, which is required for carriage on certain vessels, be digitally integrated[28] with electronic nautical charts and navigational systems? Why or why not? What cyber security concerns should be considered if electronic nautical charts and navigation systems are integrated with this equipment?

(A) EPFD providing position information;

(B) AIS;

(C) Gyro compass or other means to determine a vessel's heading by vessel-borne non-magnetic means and transmit heading information;

(D) Marine radar;

(E) Magnetic compass; or

(F) Voyage data recorder or simplified voyage data recorder.

Question 8. Current chart carriage requirements described in 33 CFR 164.33 require charts to be "of a large enough scale and have enough detail to make safe navigation of the area possible." Should a specific scale be identified in regulation? Why or why not?

Question 9. When a vessel is reliant on ENC or IENC charts, should the Coast

[28] See IEC 61162 Digital Interfaces for Navigation Equipment within a Ship and National Marine Electronics Association (NMEA) 0183 Interface Standard.

Guard require the following back-up arrangements?

(A) An equivalent system to that being used to view electronic charts as the primary means, connected to a power supply separate and independent from the primary system;

(B) A non-equivalent ECS meeting a recognized standard, connected to a power supply and independent from the primary system;

(C) Other; please specify; or

(D) No back-up arrangement required.

Question 10. Does your vessel have backup power capability? Should an ECS be connected to a backup power supply separate and independent from the primary system? What would be the cost of installing a backup source? For the purpose of understanding your response, please include the type and size of the vessel for which you are providing your response.

Question 11. If you operate a vessel, are a vessel owner, or work in an industry with vessels subject to the chart and navigational equipment carriage requirements in titles 33 and 46 of the CFR, how prevalent are electronic chart display systems within the vessel class with which you are knowledgeable? For example, in your vessel class or industry, would you consider electronic chart display systems to be very uncommon, uncommon, somewhat common, common, or very common? For reference, the Coast Guard will attempt to quantify non-numerical responses to questions for the purposes of an economic analysis. We will consider "very uncommon" to represent an adoption rate of 20 percent or less; "uncommon" to represent an adoption rate between 20 and 40 percent; "somewhat common" to represent an adoption rate between 40 and 60 percent; "common" to represent an adoption rate between 60 and 80 percent; and "very common" to represent an adoption rate of 80 percent or greater. For us to better understand the context of your response, please provide the particular area of the maritime industry or

vessel class that your estimate is for, and the basis for that estimate.

Question 12a. If your vessel lacks the navigational equipment necessary to use and display ENC charts, what is your vessel type, what equipment are you currently lacking, and what would be the estimated cost of procuring and installing this equipment? Please let us know who would procure and set up the equipment, and provide an estimate for how long these processes would take. Will your company be able to use existing vessel or shoreside maintenance personnel, or will an outside marine electrician contractor or other technician have to be hired? Are there situations where retrofitting a vessel with such equipment may not be possible? If so, why and what vessel type?

Question 12b. If the additional ENC equipment would require updates to your vessel's electrical system, please provide an estimate of the expected costs to the vessel owner. If you cannot provide a cost estimate, what type of technician would perform the update to the electrical system and how long do you estimate that would take? Would the vessel need to be docked or out of service for any of the modifications described in this question? If so, for how long? Please indicate the type of vessel in your response.

Question 13. How many hours per month do you currently spend updating paper charts? What are the costs of maintaining a corrected chart portfolio? How often do you replace paper charts? If you or your company make the updates internally who is in charge of updating them (master, mate, shore-based company employee, etc.)? If you contract with a service, how much do you pay for the services provided?

Question 14. What are the ongoing costs for the necessary electronic chart display system software, such as a charting application or subscription service? How often are technicians required to maintain or service the ECS and how much does this service cost? How often do you anticipate replacing or upgrading an electronic chart display system and what is the estimated cost to replace or upgrade it?

Question 15. If the Coast Guard were to propose electronic chart and

navigational equipment carriage requirements, what persons, entities, or organizations would be positively or negatively impacted? For example, a positive impact may include instances where an individual, vessel owner, or company may experience cost savings from time saved by no longer manually updating charts or an increase in revenue from selling electronic chart display systems or software, while a negative impact may result from an individual, vessel owner, or company taking on additional equipment costs to be in compliance.

Question 16. Are there additional measures that should be considered to relieve an economic burden if the Coast Guard were to issue a rule to establish electronic chart and navigational equipment carriage requirements? What would you consider to be the expected costs and associated benefits of the additional measures? Please provide the data and calculations for the determination of such costs and/or benefits.

Question 17. Because of the similarities between an RTCM Class "A" ECS and an ECDIS, NVIC 1-16 (Change 2) encourages mariners operating an RTCM Class "A" ECS to complete Coast Guard approved ECDIS training. For all other mariners operating other ECS systems NVIC 01-16 (Change 2) identifies training topics for mariner familiarization. Is a Coast Guard approved ECDIS course appropriate training for mariners on vessels equipped with ECS? Should ECS specific training be required for officers in charge of a navigational watch on vessels equipped with ECS? What would you consider to be the estimated costs for such training?

Dated: March 23, 2022.

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